Data Management Systems Design

Phase 3

Project title : Rent a Car

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Group Number: 10

Project Title: Rent a Car

Course Number: CS631103

Course Section: 103

Question No 2

This report should minimally cover a summary of the business requirements and any

additions you may have made, the entity-relationship design, the (relational) logical database

design, and the application program design. For each of these, you should identify the major

design decisions you faced and the design decisions you made with justifications for those

decisions.

The application program design should have at least three web pages to connect to the

database. You may choose any language and platform for your application program.

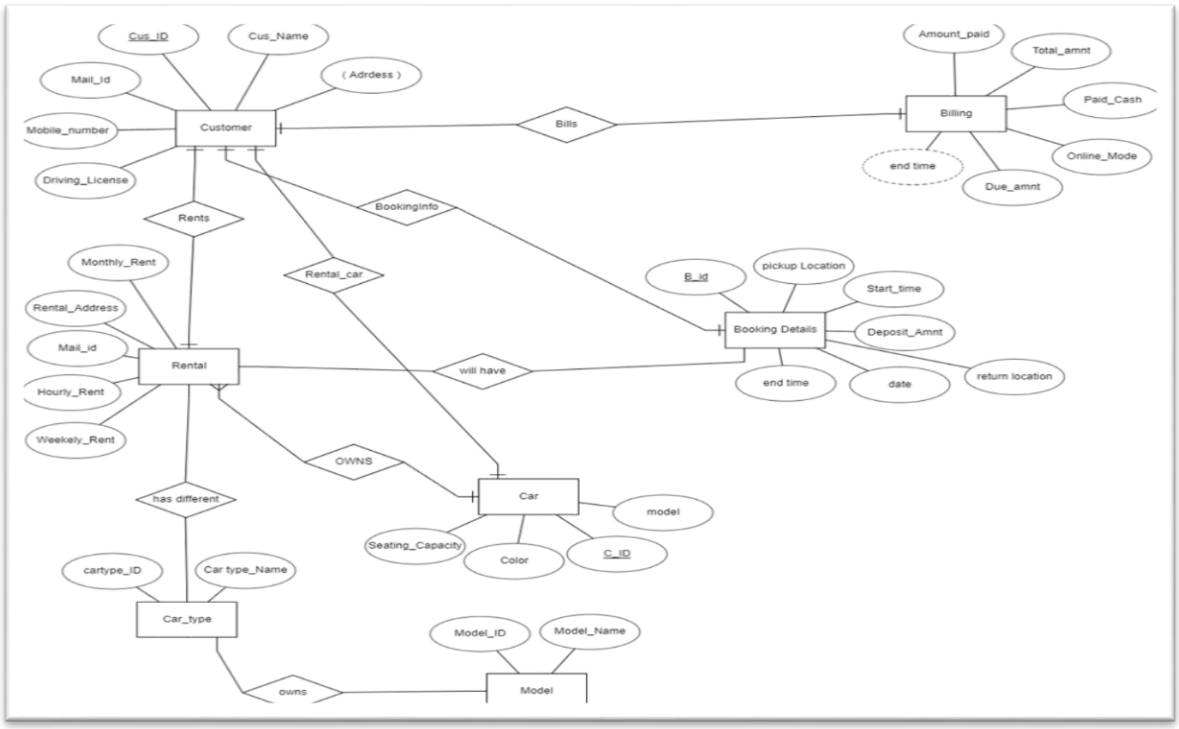
(Summary)

Rent a Car is an online software that rents automobiles for short periods of time to the public, generally ranging from a few hours to a few weeks.

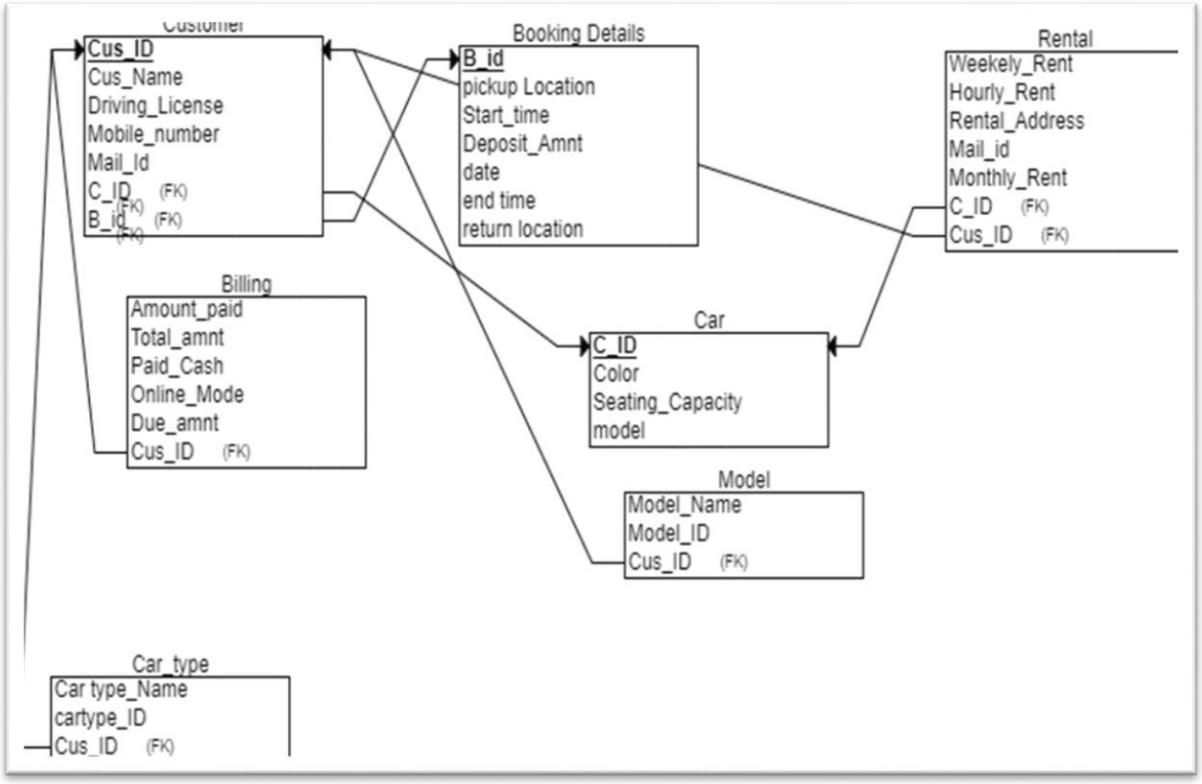
- The cost of renting a car depends on the car's class.
- In each class of rental, Rent A Car offers daily, weekly, and monthly rates. Among car models are the make of the car (Tesla, Benz, etc.), the type of car, seating capacity, and colour of the car
- A car identification number (CID) uniquely identifies each vehicle.
- Prior to picking up the car at the branch location, the customer makes a booking over the phone with the location.
- A customer's name and address, vehicle class, and the period of rental (days in and days out) are taken by the rental service agent.
- In addition to the license number of the operator and other information, the service agent discusses with the customer other details needed for the rental agreement process.

- A customer's booking information is used to assign a specific car to the rental agreement if they have made a booking.
- After the rental agreement is completed, the class rental rate is used to calculate the actual rental cost.

(Entity Relational Design)



Relational Schema

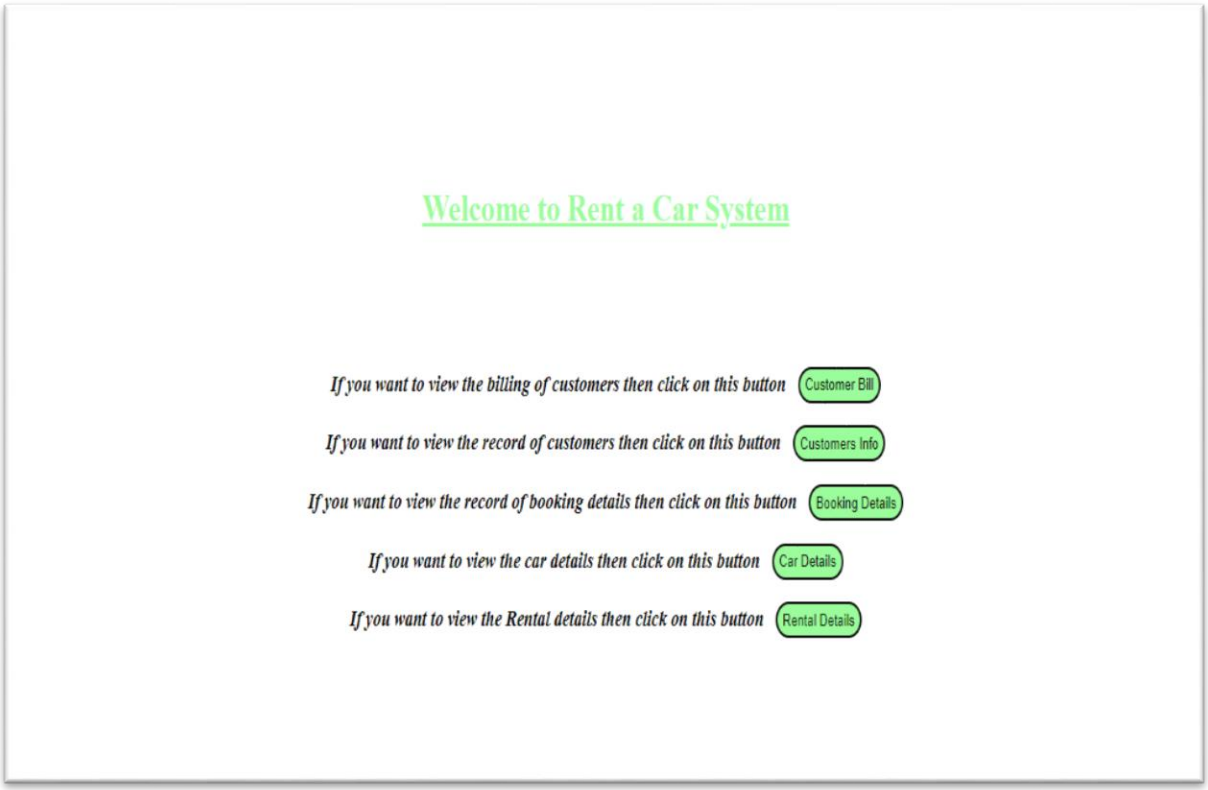


(Web Application Pages)

Web application pages are developed in html, css for front-end and php for back-end. In this we retrieve all the data or records from database and show this in our web pages and the web pages include main page, and 5 pages of php for the record

of the database and in this I first connect the php with sql database and then performs operations.

(Web Pages Screens)



Back

Customers Info

Customer ID	*Customer Name*	*Driving License*	*Mobile No*	*Email*
201	SUSHMA	145	1127890	xuu@gmail.com
202	PRIYANKA	142	1136790	yuy@gmail.com
203	SATHVIKA	143	1145533	zzu@gmail.com
204	PRATHYU	147	1152277	yyy@gmail.com
205	USHA	148	1168899	ppp@gmail.com

Back

Booking Details

Booking ID	*Pick Up Location*	*Return Location*	*Start Time*	*End Time*	*Deposit Ammount*	*Date*
4	BROADWAY	KEARNY	1.OOAM	10.00PM	100$	2NDJULY2022
6	JOURNAL SQUARE	HARRISON	2.OOAM	09.00PM	200$	3RDAUGUST2022
7	33RD STREET	HOBOKEN	3.OOAM	08.00PM	300$	4RDAUGUST2022
11	GROVE STREET	NEWARK	4.OOAM	07.00PM	700$	5RDAUGUST2022
13	BROOKLYN	BRIDGE WATER	9.OOAM	06.00PM	600$	6RDAUGUST2022

Back

Car Details

Car ID	Color	Seating Capacity	Model
12	BLACK	4	AUDI
13	GREEN	5	TESLA
14	WHITE	6	KIA
15	YELLOW	7	BENZ
16	BLUE	4	BUGATI

Back

Rental Details

Customer ID	Car ID	Weekly Rent	Hourly Rent	Monthly Rent	Email	Address
201	12	100$	150$	550$	jugg@gmail.com	21AVENUE
202	13	200$	220$	990$	ipgg@gmail.com	11AVENUE
203	14	300$	500$	980$	guug@gmail.com	77AVENUE
204	15	500$	600$	590$	gffg@gmail.com	10AVENUE
205	16	600$	600$	580$	gyy@gmail.com	39AVENUE

Customer Bill

Enter the customer id which you want to see the bill :

Submit

Back

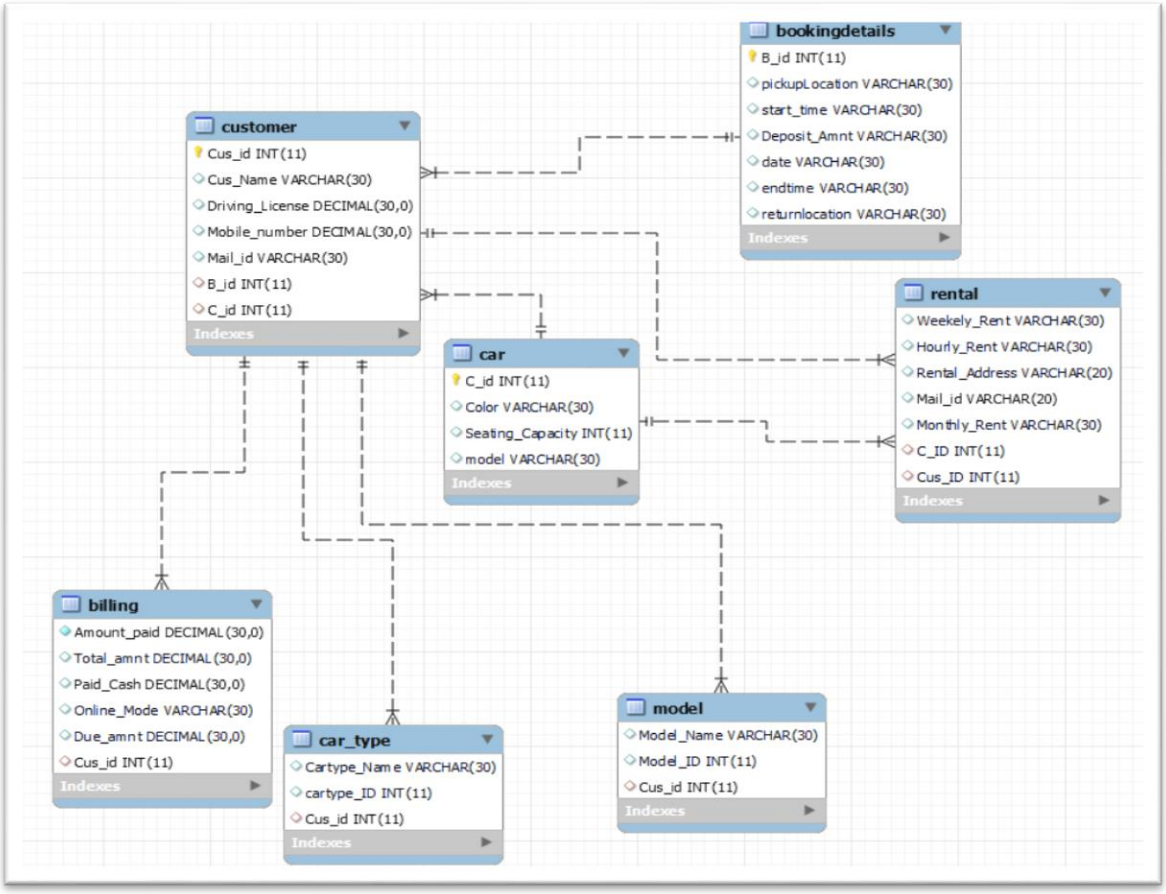
Record of customer reservation

Amount Paid	*Cash Amount*	*Due Amount*	*Total Amount*	*Online Mode*
300	700	200	780	Y

Question No 3:- Normalize the Relations: The steps to follow for each relation are:

a) Write out the relation (schema) including all attribute names. Indicate keys and foreign keys.

(Schema Design)



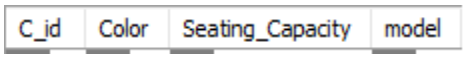
b) Provide some sample data for the relation (5 rows).

(Schema Creation in SQL)

```
create table BookingDetails(
  B_id int NOT NULL,
```

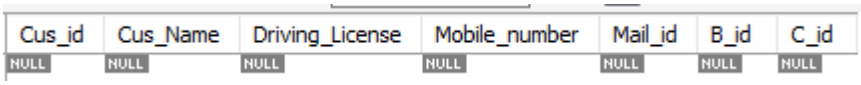
```
  pickupLocation varchar(30),
  start_time varchar(30),
  Deposit_Amnt int,
  date date,
  endtime varchar(30),
  returnlocation varchar(30),
  PRIMARY KEY (B_id)
);
```


```
create table Car(
  C_id int NOT NULL,
  Color varchar(30),
  Seating_Capacity int,
  model varchar(30),
  PRIMARY KEY (C_id)
);
```



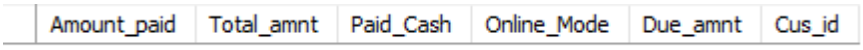

```
create table Customer(
  Cus_id int NOT NULL,
  Cus_Name varchar(30),
  Driving_License numeric(30),
  Mobile_number numeric(30),
  Mail_id varchar(30),
```

```
  PRIMARY KEY (Cus_id),
  B_id int,
  C_id int,
  FOREIGN KEY (B_id) REFERENCES BookingDetails (B_id) ON DELETE cascade ON UPDATE cascade,
  FOREIGN KEY (C_id) REFERENCES Car (C_id) ON DELETE cascade ON UPDATE cascade
);
```



Cus_id	Cus_Name	Driving_License	Mobile_number	Mail_id	B_id	C_id
NULL	NULL	NULL	NULL	NULL	NULL	NULL

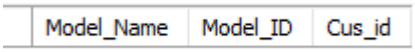
```
create table Billing(
  Amount_paid numeric(30) not null,
  Total_amnt numeric(30),
  Paid_Cash numeric(30),
  Online_Mode varchar(30),
  Due_amnt numeric(30),
  Cus_id int not null,
  FOREIGN KEY (Cus_id) REFERENCES Customer (Cus_id) ON DELETE cascade ON UPDATE cascade
);
```



	Amount_paid	Total_amnt	Paid_Cash	Online_Mode	Due_amnt	Cus_id

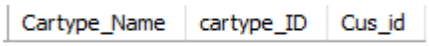
```
create table Model(
  Model_Name varchar(30),
  Model_ID int,
```

```
  Cus_id int,
  FOREIGN KEY (Cus_id) REFERENCES Customer (Cus_id) ON DELETE cascade ON
UPDATE cascade
);
```



	Model_Name	Model_ID	Cus_id

```
create table Car_type(
  Cartype_Name varchar(30),
  cartype_ID int,
  Cus_id int,
  FOREIGN KEY (Cus_id) REFERENCES Customer (Cus_id) ON DELETE cascade ON
UPDATE cascade
);
```



Cartype_Name	cartype_ID	Cus_id

```
create table Rental(
  Weekely_Rent numeric(30),
  Hourly_Rent numeric(30),
  Rental_Address varchar(20),
  Mail_id varchar(20),
  Monthly_Rent numeric(30),
  C_ID int,
  Cus_ID int,
  FOREIGN KEY (C_id) REFERENCES Car (C_id) ON DELETE cascade ON UPDATE
cascade,
```

FOREIGN KEY (Cus_id) REFERENCES Customer (Cus_id) ON DELETE cascade ON UPDATE cascade

);

Weekely_Rent	Hourly_Rent	Rental_Address	Mail_id	Monthly_Rent	C_ID	Cus_ID

Sample data entry in SQL

INSERT INTO BookingDetails VALUES(1,'BROADWAY','1.OOAM','100$','2NDJULY2022','10.00PM','KEARNY');

INSERT INTO BookingDetails VALUES(2,'JOURNAL SQUARE','2.OOAM','200$','3RDAUGUST2022','09.00PM','HARRISON');

INSERT INTO BookingDetails VALUES(3,'33RD STREET','3.OOAM','300$','4RDAUGUST2022','08.00PM','HOBOKEN');

INSERT INTO BookingDetails VALUES(4,'GROVE STREET','4.OOAM','700$','5RDAUGUST2022','07.00PM','NEWARK');

INSERT INTO BookingDetails VALUES(5,'BROOKLYN','9.OOAM','600$','6RDAUGUST2022','06.00PM','BRIDGE WATER');

B_id	pickupLocation	start_time	Deposit_Amnt	date	endtime	returnlocation
1	BROADWAY	1.OOAM	100$	2NDJULY2022	10.00PM	KEARNY
2	JOURNAL SQUARE	2.OOAM	200$	3RDAUGUST2022	09.00PM	HARRISON
3	33RD STREET	3.OOAM	300$	4RDAUGUST2022	08.00PM	HOBOKEN
4	GROVE STREET	4.OOAM	700$	5RDAUGUST2022	07.00PM	NEWARK
5	BROOKLYN	9.OOAM	600$	6RDAUGUST2022	06.00PM	BRIDGE WATER
NULL	NULL	NULL	NULL	NULL	NULL	NULL

INSERT INTO CAR VALUES(12,'BLACK',4,'AUDI');

INSERT INTO CAR VALUES(13,'GREEN',5,'TESLA');

INSERT INTO CAR VALUES(14,'WHITE',6,'KIA');

INSERT INTO CAR VALUES(15,'YELLOW',7,'BENZ');

INSERT INTO CAR VALUES(16,'BLUE',4,'BUGATI');

C_id	Color	Seating_Capacity	model
12	BLACK	4	AUDI
13	GREEN	5	TESLA
14	WHITE	6	KIA
15	YELLOW	7	BENZ
16	BLUE	4	BUGATI
NULL	NULL	NULL	NULL

INSERT INTO CUSTOMER
VALUES(201,'SUSHMA',145,1127890,'xuu@gmail.com',4,12);

INSERT INTO CUSTOMER
VALUES(202,'PRIYANKA',142,1136790,'yuy@gmail.com',6,13);

INSERT INTO CUSTOMER
VALUES(203,'SATHVIKA',143,1145533,'zzu@gmail.com',7,14);

INSERT INTO CUSTOMER
VALUES(204,'PRATHYU',147,1152277,'yyy@gmail.com',11,15);

INSERT INTO CUSTOMER
VALUES(205,'USHA',148,1168899,'ppp@gmail.com',13,16);

Cus_id	Cus_Name	Driving_License	Mobile_number	Mail_id	B_id	C_id
201	SUSHMA	145	1127890	xuu@gmail.com	4	12
202	PRIYANKA	142	1136790	yuy@gmail.com	6	13
203	SATHVIKA	143	1145533	zzu@gmail.com	7	14
204	PRATHYU	147	1152277	yyy@gmail.com	11	15
205	USHA	148	1168899	ppp@gmail.com	13	16
NULL	NULL	NULL	NULL	NULL	NULL	NULL

INSERT INTO BILLING VALUES('300$','780$','700$','Y','200$',201);

INSERT INTO BILLING VALUES('200$','980$','690$','Y','290$',202);

INSERT INTO BILLING VALUES('400$','680$','800$','Y','280$',203);

INSERT INTO BILLING VALUES('500$','380$','500$','Y','270$',204);

INSERT INTO BILLING VALUES('100$','580$','850$','Y','260$',205);

Amount_paid	Total_amnt	Paid_Cash	Online_Mode	Due_amnt	Cus_id
300	780	700	Y	200	201
200	980	690	Y	290	202
400	680	800	Y	280	203
500	380	500	Y	270	204
100	580	850	Y	260	205

INSERT INTO MODEL VALUES('TESLA X',930,201);

INSERT INTO MODEL VALUES('KIA EV6',999,202);

INSERT INTO MODEL VALUES('BENZ C300',777,203);

INSERT INTO MODEL VALUES('BUGATI EB',110,204);

INSERT INTO MODEL VALUES('AUDI R8',139,205);

Model_Name	Model_ID	Cus_id
TESLA X	930	201
KIA EV6	999	202
BENZ C300	777	203
BUGATI EB	110	204
AUDI R8	139	205

INSERT INTO CAR_TYPE VALUES('PETROL',1,201);

INSERT INTO CAR_TYPE VALUES('GAS',2,202);

INSERT INTO CAR_TYPE VALUES('DIESEL',3,203);

INSERT INTO CAR_TYPE VALUES('ELECTRIC',7,204);

Cartype_Name	cartype_ID	Cus_id
PETROL	1	201
GAS	2	202
DIESEL	3	203
ELECTRIC	7	204

```
INSERT INTO RENTAL
VALUES('100$','150$','21AVENUE','jugg@gmail.com','550$',12,201 );

INSERT INTO RENTAL
VALUES('200$','220$','11AVENUE','ipgg@gmail.com','990$',13,202);

INSERT INTO RENTAL
VALUES('300$','500$','77AVENUE','guug@gmail.com','980$',14,203 );

INSERT INTO RENTAL
VALUES('500$','600$','10AVENUE','gffg@gmail.com','590$',15,204 );

INSERT INTO RENTAL
VALUES('600$','600$','39AVENUE','gyy@gmail.com','580$',16,205 );
```

Weekely_Rent	Hourly_Rent	Rental_Address	Mail_id	Monthly_Rent	C_ID	Cus_ID
100$	150$	21AVENUE	jugg@gmail.com	550$	12	201
200$	220$	11AVENUE	ipgg@gmail.com	990$	13	202
300$	500$	77AVENUE	guug@gmail.com	980$	14	203
500$	600$	10AVENUE	gffg@gmail.com	590$	15	204
600$	600$	39AVENUE	gyy@gmail.com	580$	16	205

c) State the Key for the relation and write down Functional Dependencies.

Keys:-

- Customers->Cus_id
- Booking_Details->B_id
- Car->C_id

Functional Dependencies:-

- Car->Customer
- Booking_Details-> Customer
- reservations->customers
- reservations->Locations
- Locations_phone->Locations

- Rental -> Customer

d) State that this relation is in 3NF.

If a relation fails to meet the definition of a third normal form (e.g., it contains a partial-

key dependency or it contains a transitive dependency), then split the relation into new

relations.

Begin the normalization process from the beginning with each of these new relations.

Already in 3rd normal form if tables are broken there will be useless relations.

Question No 4:-Write four queries in English and answer in SQL code, show a screen dump or SNIP

that shows the SQL code and the result (You may use the same queries from Phase II).

I) Group By Query

SELECT endtime,COUNT(endtime) FROM BOOKINGDETAILS GROUP BY endtime;

endtime	COUNT(endtime)
06.00PM	1
07.00PM	1
08.00PM	1
09.00PM	1
10.00PM	1

II) Group By and Having Clause Query

SELECT COUNT(endtime), pickupLocation

FROM BOOKINGDETAILS

GROUP BY pickupLocation

HAVING COUNT(endtime) = 1;

COUNT(endtime)	pickupLocation
1	33RD STREET
1	BROADWAY
1	BROOKLYN
1	GROVE STREET
1	JOURNAL SQUARE

III)Nested Query with All

SELECT * FROM RENTAL WHERE Cus_id IN (SELECT Cus_id FROM customer);

Weekely_Rent	Hourly_Rent	Rental_Address	Mail_id	Monthly_Rent	C_ID	Cus_ID
100$	150$	21AVENUE	jugg@gmail.com	550$	12	201
200$	220$	11AVENUE	ipgg@gmail.com	990$	13	202
300$	500$	77AVENUE	guug@gmail.com	980$	14	203
500$	600$	10AVENUE	gffg@gmail.com	590$	15	204
600$	600$	39AVENUE	gyy@gmail.com	580$	16	205

Iv) Nested Query with In

SELECT model FROM CAR WHERE C_id = ALL (SELECT C_id FROM CUSTOMER WHERE Cus_Name='SUSHMA');

model
AUDI

Question No 5:-A narrative conclusion section that describes:

a) the group's experience with the project (which steps were the most difficult? Which were

the easiest? what did you learn that you did not imagine you would have? if you had to do it

all over again, what would you have done differently?)

- **Difficult Part:**

We faced difficulties as a group in how to import database in phpmyadmin and how to create a mechanism for this database. How to set the foreign and primary keys for every table and how to connect the database with the web pages and how to create the logic of group by queries.

- **Easiest Part:**

Easiest part in this project when we design the schema and according to schema creating database is the most easiest part in this project through this we come to know if we first develop the schema then we easily create and develop the diagram and another easiest part as we are talking about as a group we divide the whole work into two portion and then start working on this through this we easily manage the whole project.

- **Learnings:**

We learned so many things in this project like connecting databases with web pages and how to import or extract the database from phpmyadmin and in mysql. Through this our concepts of group by, having and joins queries is more cleared now. We also learned how to set properly the concept of primary keys and foreign keys.

b) any final comments and conclusions.

Working on same project in future:

If in future, I'll work in this project then I add the concept of user login and sign-up tables mean through this all the data will be saved in this table and then user wants to login user enter their email and password and we verify his/her email and password from database and the allow user to use this.